

WHAT IS CLAIMED IS:

1. A method of monitoring a dispersion on a transmission optical fiber in a wavelength division multiplexing optical transmission system, said method comprising the steps of:

extracting two or more of wavelength channels 1 to n from the transmission optical fiber; and

monitoring dispersions of the extracted wavelength channels.

2. The method according to Claim 1, wherein the step of monitoring the dispersions comprises the steps of:

measuring a first dispersion value in the extracted wavelength channels 1 to n (wavelength: $\lambda_{\text{mon}1}$ to $\lambda_{\text{mon}n}$) at a certain temperature $T_1(^{\circ}\text{C})$;

measuring a second dispersion value in the wavelength channels 1 to n at a certain other temperature $T_2(^{\circ}\text{C})$;

providing dispersion variation amounts $\Delta D_{\text{mon}1}$ to $\Delta D_{\text{mon}n}$ in the extracted wavelength channels 1 to n from a difference between the measured first dispersion value and the measured second dispersion value; and

providing a dispersion variation amount at an arbitrary wavelength (λ) based on the provided dispersion variation amounts $\Delta D_{\text{mon}1}$ to $\Delta D_{\text{mon}n}$.

3. The method according to Claim 2, wherein the n is

2 and the step of providing the dispersion variation amount calculates a dispersion variation amount $\Delta D(\lambda)$ in an arbitrary wavelength (λ) by the following equation.

$$\Delta D(\lambda) = \frac{\Delta D_{mon2} - \Delta D_{mon1}}{\lambda_{mon2} - \lambda_{mon1}} \cdot (\lambda - \lambda_{mon1}) + \Delta D_{mon1}$$

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4. The method according to Claim 1, wherein the step of monitoring the dispersions comprises the steps of:

measuring a first dispersion value in a desired wavelength channel at a certain temperature $T_1(^{\circ}\text{C})$;

10 measuring a second dispersion value in the desired wavelength channel at a certain other temperature $T_2(^{\circ}\text{C})$; and

providing a dispersion variation amount in the desired wavelength channel from a difference between the
15 measured first dispersion and the measured second dispersion value.

5. A method of compensating a temperature dependency of a dispersion slope in a wavelength division multiplexing
20 optical transmission system, said method comprising the steps of:

providing the dispersion variation amount $\Delta D(\lambda)$ by the method according to any one of Claims 2 to 4; and

compensating the temperature dependency of the
25 dispersion slope by using the provided dispersion variation amount $\Delta D(\lambda)$.

6. The method according to Claim 5, wherein the step of compensating the temperature dependency of the dispersion slope comprises the steps of:

5 dividing a signal light on the transmission optical fiber to one or more wavelength channel groups constituted by at least one wavelength channel; and

 compensating the dispersion in accordance with each of the divided one or more wavelength channel groups.

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7. The method according to Claim 5, wherein the step of compensating the temperature dependency of the dispersion slope summarizingly compensates a wavelength dependency of the temperature dependency of the dispersion
15 in all of bandwidths in a wavelength division multiplexing optical transmission system.

8. The method according to Claim 6, wherein the step of compensating the dispersion is carried out by using one
20 or more tunable dispersion equalizers with a fiber Bragg grating.

9. The method according to Claim 6, wherein the step of compensating the dispersion is carried out by using one
25 or more tunable dispersion equalizers with a filter.

10. The method according to Claim 7, wherein the step

of compensating the temperature dependency of the dispersion slope is carried out by using one or more tunable dispersion equalizers with a fiber Bragg grating.

5 11. The method according to Claim 7, wherein the step of compensating the temperature dependency of the dispersion slope comprises the step of:

 providing a temperature change in a dispersion compensating optical fiber installed at an optical node.

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 12. A dispersion monitoring apparatus for monitoring a dispersion on a transmission optical fiber in a wavelength division multiplexing optical transmission system, said dispersion monitoring apparatus comprising:

15 extracting means for extracting two or more of wavelength channels from the transmission optical fiber; and

 monitoring means for monitoring dispersions of the extracted wavelength channels.

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 13. A dispersion slope temperature dependency compensating apparatus for compensating a temperature dependency of a dispersion slope in a wavelength division multiplexing optical transmission system, said dispersion slope temperature dependency compensating apparatus comprising:

25 monitoring means for monitoring dispersions of two

or more of wavelength channels on a transmission optical fiber; and

compensating means for compensating a wavelength dependency of the temperature dependency of the dispersion
5 in an arbitrary wavelength channel by using the monitored dispersions.

14. The dispersion slope temperature dependency compensating apparatus according to Claim 13, wherein said
10 compensating means comprising:

means for dividing a signal light on the transmission optical fiber into one or more wavelength channel groups constituted by at least one wavelength channel; and

means for compensating the dispersion in accordance
15 with each of the divided one or more wavelength channel groups.

15. The dispersion slope temperature dependency compensating apparatus according to Claim 13, wherein said
20 compensating means summarizingly compensates the wavelength dependency of the temperature dependency of the dispersion in all of bandwidths in a wavelength division multiplexing optical transmission system.

25 16. The dispersion slope temperature dependency compensating apparatus according to Claim 14, wherein said compensating means includes one or more tunable dispersion

equalizers with a fiber Bragg grating.

17. The dispersion slope temperature dependency compensating apparatus according to Claim 14, wherein said
5 compensating means includes one or more tunable dispersion equalizers with a filter.

18. The dispersion slope temperature dependency compensating apparatus according to Claim 15, wherein said
10 compensating means includes one or more tunable equalizers with a fiber Bragg grating.

19. The dispersion slope temperature dependency compensating apparatus according to Claim 15, wherein said
15 compensating means comprising:

a dispersion compensating optical fiber installed in an optical node; and

means for providing a temperature change to the dispersion compensating optical fiber.